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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/765,623
Filing Date: January 27, 2004
Appellant(s): YANIV ET AL.

Kelly K. Kordzik
For Appellant

EXAMINER'S ANSWER

MAILED

APR 20 2006

GROUP 2800

This is in response to the appeal brief filed February 2, 2006 appealing from the Office action mailed November 24, 2004.

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(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 6,019,656	PARK et al.	02-2000
US 6,653,366	IMAI et al.	11-2003
US 6,097,138	NAKAMOTO et al.	08-2000
US 6,312,303	YANIV et al.	11-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Park et al. (US 6,019,656).

Regarding claim 1, Park discloses an apparatus comprising a substrate (11) with holes therein, and carbon nanotubes (13) deposited in the empty holes (Fig. 1A-1C).

In regards to the limitations “embossed therein with a die” and “embossed holes”, the examiner notes that applicant is claiming the product of an apparatus including a method (i.e. a process) of making the substrate with holes “embossed therein with a die”, consequently, claims 1 is considered a “product-by-process” claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Furthermore, patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113). As such, Park's teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

Claim 1 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Imai et al. (US 6,653,366).

Regarding claim 1, Imai discloses an apparatus comprising a substrate (11) with holes (12) therein, and carbon nanotubes (13) deposited in the empty holes (Fig. 3A).

In regards to the limitations “embossed therein with a die” and “embossed holes”, the examiner notes that applicant is claiming the product of an apparatus including a method (i.e. a process) of making the substrate with holes “embossed therein with a die”, consequently, claim 1 is considered a “product-by-process” claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Furthermore, patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113). As such, Imai’s teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

Claim 1 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nakamoto (U.S. 6,097,138).

Regarding claim 1, Nakamoto discloses an apparatus comprising a substrate (52) with holes therein, and carbon nanotubes (16) deposited in the empty holes (Figs 8A-8C).

In regards to the limitations “embossed therein with a die” and “embossed holes”, the examiner notes that applicant is claiming the product of an apparatus including a method (i.e. a process) of making the substrate with holes “embossed therein with a die”, consequently, claims 1 is considered a “product-by-process” claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Furthermore, patentability of a claim to a product does not rest merely on the

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difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113). As such, Nakamoto's teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

Regarding claim 2, Nakamoto discloses an apparatus further comprising a conductive layer (28) within the substrate (52) electrically connecting at least a portion of the carbon nanotubes with a plurality of the holes (Fig. 10).

Regarding claim 3, Nakamoto discloses an apparatus further comprising a gate electrode (54) coextensive with the substrate (52).

Regarding claim 5, Nakamoto discloses an apparatus further comprising an anode (76) positioned a distance from the substrate, having a cathodoluminescent material (78) for emitting photons in response to bombardment from electrons emitted by the carbon nanotubes (Fig. 10).

Regarding claim 6, Nakamoto discloses an apparatus further comprising circuitry for causing the electrons to be emitted by the carbon nanotubes.

Claims 7-9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaniv et al (US 6,312,303) in view of Nakamoto (U.S. 6,097,138).

Regarding claims 3, 7-9, 11 and 12, Yaniv discloses a data processing system comprising a processor, a memory device, a storage device, an input device, a display device and a bus system for coupling the processor to the memory device, the storage device, the input device, and a display device.

Yaniv discloses the suitability of using a nanotube-based field emission device as the display device component, however, fails to disclose the display device comprising a substrate with holes therein, and carbon nanotubes deposited in the empty holes. Yaniv further discloses the field emission device comprising an anode positioned a distance from the substrate, having a phosphor for emitting photons in response to bombardment from electrons emitted by the carbon nanotubes, the optional implementation of gate electrodes (509) within the display device and circuitry for causing the electrons to be emitted by the carbon nanotubes.

In the same field of endeavor, Nakamoto discloses an apparatus comprising a substrate (52) with holes therein, and carbon nanotubes (16) deposited in the empty holes (Figs 8A-8C), a conductive layer (28) within the substrate (52) electrically connecting at least a portion of the carbon nanotubes with a plurality of the holes (Fig. 10), a gate electrode (54) coextensive with the substrate (52), an anode (76) positioned a distance from the substrate, having a cathodoluminescent material (78) for emitting photons in response to bombardment from electrons emitted by the carbon nanotubes (Fig. 10) and circuitry for causing the electrons to be emitted by the carbon nanotubes. The nanotube's arrangement within the substrate provides for increase high-density nanotubes per unit area thus obtaining excellent luminous efficacy. Accordingly, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the nanotube-based display device of Nakamoto in the data processing system of Yaniv in order to provide a display device with increase high density nanotubes per unit area thus obtaining excellent luminous efficacy.

In regards to the limitations "embossed therein with a die" and "embossed holes" as recited in claim 7, the examiner notes that applicant is claiming the product of an apparatus including a method (i.e. a process) of making the substrate with holes "embossed therein with a die", consequently, claim 7 is a considered "product-by-process" claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the

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recited process that is covered by the claim. Furthermore, patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113). As such, Nakamoto's teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

(10) Response to Argument

Applicant's arguments beginning at Page 5, in regards to the rejection of claim 1 under 35 U.S.C. § 102(b), or alternatively, under 35 U.S.C. § 103(a) over Park et al. (US 6,019,656) have been considered but are not persuasive.

Applicant contends that the specification presents an explicit definition for the term "embossed", specifically, "Embossing may utilize a metal die and counter along with heat and pressure to reshape the surface of a material" (Page 3, lines 18 of the specification), thus, the special definition should control interpretation of the term as it used in the claim. Although, the examiner agrees with applicant's assertion that special definitions disclosed in the specification should control interpretation of the term as it is used in the claim, it is noticed that the claim subject matter is directed to a product including a recitation directed to the method of manufacturing the holes in the substrate, thus, the claim is considered to be a product-by-process claim. Applicant's special definition pertains to the process limitation. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product

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itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113).

Although Park fails to exemplify the limitation of “embossing with a die” as the method of manufacturing the holes in the substrate, Park’s teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

Applicant contends that the embossing process can be practiced on a wider range of substrate materials and allows more flexibility and precision in the geometry of the hole and the pitch of the pattern. However, Applicant’s has failed to point out or indicate which structural characteristics differentiate the substrate claimed in the instant application from the substrate disclosed by Park. Furthermore, it is noticed that Park teaches the formation of a micro-array structure of holes, and further acknowledges that the geometrical function of the micro-array structure influence the deposition of the nanotubes within the holes (Column 2, lines 11-28), accordingly, there is a reasonable suggestion within Park’s teaching of an apparatus substrate further requiring precision in the geometry of the hole and pitch of the pattern obtained by using an etching technique.

For the above stated reasons, it is considered that the applicant has failed to provide evidence in the record to support his contention that the apparatus disclosed by Park is patentable distinct from the apparatus covered by claim 1 of the instant application.

Applicant's arguments beginning at Page 6, in regards to the rejection of claim 1 under 35 U.S.C. § 102(b), or alternatively, under 35 U.S.C. § 103(a) over Imai et al. (US 6,653,366) have been considered but are not persuasive.

Applicant contends that the specification presents an explicit definition for the term "embossed", specifically, "Embossing may utilize a metal die and counter along with heat and pressure to reshape the surface of a material" (Page 3, lines 16-20 of the specification), thus, the special definition should control interpretation of the term as it used in the claim. Although, the examiner agrees with applicant's assertion that special definitions disclosed in the specification should control interpretation of the term as it is used in the claim, it is noticed that the claim subject matter is directed to a product including a recitation directed to the method of manufacturing the holes in the substrate, thus, the claim is considered to be a product-by-process claim. Applicant's special definition pertains to the process limitation. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113).

Although Imai fails to exemplify the limitation of "embossing with a die" as the method of manufacturing the holes in the substrate, Imai's teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

Applicant contends that the embossing process can be practiced on a wider range of substrate materials and allows more flexibility and precision in the geometry of the hole and the pitch of the pattern. However, Applicant's has failed to point out or indicate which structural characteristics differentiate the substrate claimed in the instant application from the substrate disclosed by Imai.

Applicant contends that Imai does not teach depositing carbon nanotubes in the holes, since Imai discloses the use of carbon ink with an organic binder and a solvent, in which carbon particles are selected from at least one of carbon nanotubes, graphite, and carbon fibers, made into carbon powder by pulverizing. The examiner notes that Imai discloses, at Column 5, lines 50-60,

"In the carbon ink and the electron-emitting element in accordance with the present invention, it is preferable that the carbon particles include carbon nanotubes. With this configuration, the carbon nanotubes do not only have a high electron emission efficiency due to their longish, rod-like molecule shape, but in conjunction with the present invention, many carbon nanotubes are supported by the support particles, and assume an upright orientation with respect to the substrate to which they adhere, so that electric fields tend to concentrate even better at the tip of the carbon nanotubes, which leads to an even higher efficiency". Accordingly, although the carbon nanotubes may be pulverized, they maintain the general nanotube shape as exemplified by Imai's teachings.

For the above stated reasons, it is considered that the applicant has failed to provide evidence in the record to support his contention that the apparatus disclosed by Imai is patentable distinct from the apparatus covered by claim 1 of the instant application.

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Applicant's arguments beginning at Page 9, in regards to the rejection of claim 1 under 35 U.S.C. § 102(b), or alternatively, under 35 U.S.C. § 103(a) over Nakamoto et al. (US 6,097,138) have been considered but are not persuasive.

Applicant contends that the specification presents an explicit definition for the term "embossed", specifically, "Embossing may utilize a metal die and counter along with heat and pressure to reshape the surface of a material" (Page 3, lines 16-20 of the specification), thus, the special definition should control interpretation of the term as it used in the claim. Although, the examiner agrees with applicant's assertion that special definitions disclosed in the specification should control interpretation of the term as it is used in the claim, it is noticed that the claim subject matter is directed to a product including a recitation directed to the method of manufacturing the holes in the substrate, thus, the claim is considered to be a product-by-process claim. Applicant's special definition pertains to the process limitation. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113).

Although Nakamoto fails to exemplify the limitation of "embossing with a die" as the method of manufacturing the holes in the substrate, Nakamoto's teaching of a substrate comprising holes therein, meets the structural limitations implied by the claimed process.

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Applicant contends that the embossing process can be practiced on a wider range of substrate materials and allows more flexibility and precision in the geometry of the hole and the pitch of the pattern. However, Applicant's has failed to point out or indicate which structural characteristics differentiate the substrate claimed in the instant application from the substrate disclosed by Nakamoto.

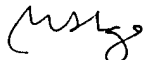
Applicant has failed to provide evidence in the record to support his contention that the apparatus disclosed by Nakamoto is patentable distinct from the apparatus covered by claim 1 of the instant application.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Mariceli Santiago

Primary Examiner

Conferees:



Ricky Mack

Supervisory Examiner



Nimesh Patel

Supervisory Examiner